

A line drawing of the HI 91413 ammonia meter. The device has a rectangular body with a control panel on the front. The panel includes a small LCD screen displaying '15.241 Result' and '2 mg/L'. Below the screen are buttons for 'LOO', 'HOLD', and 'START'. To the right of the screen are three buttons labeled 'UNIT', 'MODE', and 'CAL'. The text 'HI 91413 AMMONIA' and the 'HANNA' logo are printed on the panel. A cylindrical test tube holder is mounted on top of the device, holding a test tube and a pipette. A power cord is connected to the back of the unit.

Dear Customer,

Thank you for choosing a Hanna product. This manual will provide you with the necessary information for the correct use of the instrument. Please read it carefully before using the meter. If you need additional technical information, do not hesitate to e-mail us at tech@hannainst.com.

This instrument is in compliance with **CE** directives.

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MODEL IDENTIFICATION

Two models are available:

HI 84185-01 - 115 Vac power supply

HI 84185-02 - 230 Vac power supply

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PRELIMINARY EXAMINATION

Please examine this product carefully. Make sure that the instrument is not damaged. If any damage occurred during shipment, please notify your Dealer.

Each **HI 84185** instrument is supplied complete with:

- Reagents set for 20 tests
- One 1000 μL automatic pipette
- Six plastic tips for the 1000 μL automatic pipette
- Two 50 mL beakers
- **HI 61101** Ammonia electrode
- **HI 7662-T** Temperature probe
- Stir bar (2 pcs.)
- Power cable
- **HI 4001-40** Refilling solution (4 \times 30 mL)
- **HI 4001-51** Replacement membrane (10 pcs.)
- One **HI 4000-47-4** and one **HI 4000-47-7** pH 4 & 7 powder packets
- One 1 mL syringe
- One 1 mL pipette
- Instruction sheet
- Instruction manual
- One pair of tweezers

Note: Save all packing material until you are sure that the instrument works correctly. Any defective item must be returned in its original packing.

GENERAL DESCRIPTION

The **HI 84185** is a low cost, easy to use, ammonia nitrogen (N-NH_3) ISE instrument that performs automatic analysis with all the necessary calculations assuring to the user a simple and effective interface.

The instrument comes with a powerful and effective built-in algorithm to analyse the shape of the ISE electrode response and to determine the reaction completion.

By simply pressing the **Start** key, the instrument performs automatic analysis, all the necessary calculations and verifications. The result is immediately displayed in convenient units, then the instrument is ready for another measurement.

SIGNIFICANCE OF USE

The nitrogenous compounds of must and wine are deriving from grapes and play important role in fermentation, clarification, and potential microbial instability of wines. They are profoundly modified during the alcoholic fermentation by the physiologic activity of yeast. Thus, yeast assimilates 60-70% of the must nitrogen, ammonium ion completely disappearing during the fermentation and the total nitrogen being slightly reduced.

Ammonia is present in grapes as ammonium ion in a few milligrams amount and it serves as the primary form of available nitrogen for yeast metabolism. So, the content of ammonium ion can drastically decrease during the alcoholic fermentation, increasing again, especially in red wines, at the end of the malolactic fermentation because the lactic bacteria release ammonia nitrogen in wine. The amount of ammonium ion in must influences the rapidity of fermentation start and evolution.

The ammonia concentration ranges from 24 to 209 mg/L (ppm) in grapes and from a few mg/L (ppm) to about 50 mg/L (ppm) in wine.

The **HI 84185** ISE Ammonia Nitrogen meter measures the ammonia nitrogen (N-NH_3) content in wine using an ion selective electrode. The used method is double standard addition, a simple and rapid method of analysis, and the result is readily displayed in ammonia nitrogen (N-NH_3) mg/L (ppm).

SPECIFICATIONS

Range	0 to 50 mg/L (ppm) N-NH ₃
Resolution	1 mg/L (ppm) N-NH ₃
Accuracy	±5% of reading
Sample volume	50 mL
Temperature Compensation	Automatic from 0 to 80 °C
Electrode	HI 61101 Ammonia combined ISE
Temperature Probe	HI 7662-T (included)
LOG feature	50 samples
Stirring speed	500 rpm
Environment	0 to 50 °C (32 to 122 °F); max 95% RH non-condensing
Power supply	220V/50Hz; 10VA
Dimensions	208 x 214 x 163 mm (8.2 x 8.4 x 6.4") (with beaker)
Weight	2200 g (77.6 oz.)

REQUIRED REAGENTS

<u>Code</u>	<u>Description</u>	<u>Quantity/Test</u>
HI 84185-0	ISA alkaline reagent	1 mL
HI 84185-1	Standard 1	1 mL
HI 84185-2	Standard 2	1 mL

PRINCIPLE OF OPERATION

The determination of ammonia nitrogen concentration is made according to double standard addition method. This technique enables an unknown concentration and the electrode's slope factor to be determined simultaneously.

The Automatic Temperature compensation is available using **HI 7662-T** temperature probe. By setting the electrode isopotential point and enabling temperature compensation option in **Setup** menu, the obtained concentration is temperature compensated.

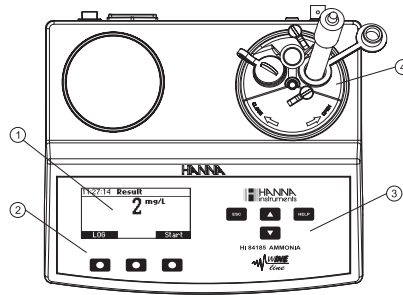
The accuracy of the obtained result depends on the stability of the mV reading in every step of the measurement.

Three selectable stability criteria can be selected in **Setup** menu. Select **Medium** or **Accurate** criteria in order to have accurate analysis.

FUNCTIONAL DESCRIPTION

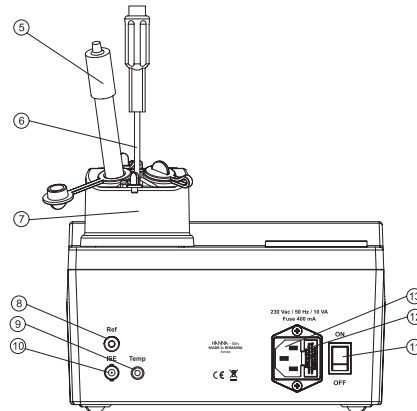
INSTRUMENT DESCRIPTION

FRONT PANEL



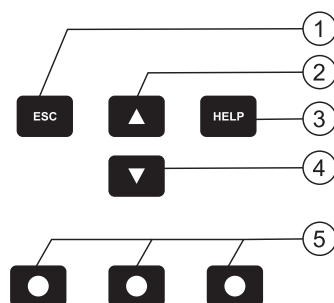
- 1) Graphic LCD
- 2) Functional keys
- 3) Keypad
- 4) Electrode holder

REAR PANEL



- | | |
|-----------------------------|-----------------------------|
| 5) Ammonia electrode | 10) BNC electrode connector |
| 6) Temperature probe | 11) Power switch |
| 7) Electrode holder | 12) Fuse |
| 8) Reference socket | 13) Power cable connector |
| 9) Temperature probe socket | |

KEYPAD DESCRIPTION



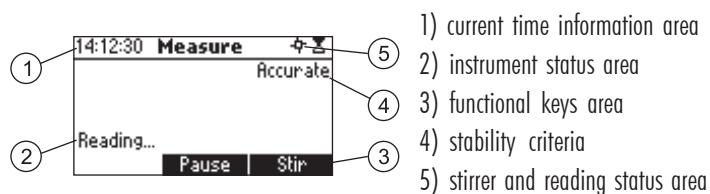
- 1) **ESC** - to leave the current screen and to return either to the previous screen or to the main screen. In the setup parameter modifying mode by pressing **ESC** the value is not modified.
- 2) **▲** - to modify a parameter value, to scroll the information from the instrument's setup
- 3) **HELP** - to access/leave the instrument's contextual help
- 4) **▼** - to modify a parameter value, to scroll the information from the instrument's setup
- 5) Functional Keys

START UP

- Place the instrument on a flat table. Do not place the instrument in direct sunlight.
- Connect the instrument to mains socket with ground connection and the correct voltage and frequency. See the label on the instrument rear for this.
- Connect the **HI 61101** ammonia electrode and the **HI 7662-T** temperature probe.
- Turn the instrument **ON** using the power switch from the rear panel of the instrument and wait until main screen is displayed.

GUIDE TO DISPLAY CODES

During the instrument's operation a series of informations are displayed on the LCD.



Icons from the stirrer and reading status area



When the input reading is unstable.

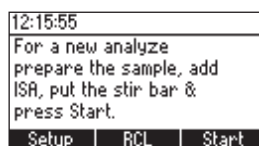


When the stirrer is on.



Temperature warning (only if the "Temperature compensation" is disabled). The warning symbol will be displayed if the temperature difference between the temperature of the sample confirmed at the first step and the subsequent readings is greater than 3 °C.

Measure screens



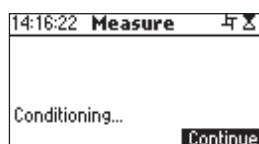
Main screen display

Press **Setup** to access the instrument's setup.

Press **RCL** to view logged data.

Press **Start** to begin a new measurement cycle.

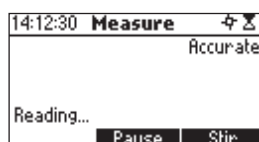
Press **HELP** at any moment to view the contextual help.



Conditioning screen

A two minutes conditioning period is initiated.

Press **Continue** to stop this conditioning period and skip the message.

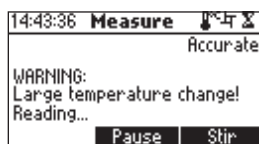


Measure screen

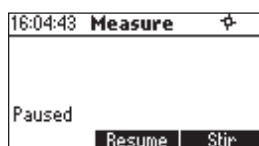
Press **ESC** at any moment during the measurement cycle and the instrument will return to the main screen.

Press **Pause** to pause the measurement process.

Press **Stir** to start/stop the stirrer.

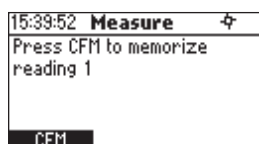


If the difference between the temperature of the sample confirmed at the first step and the subsequent readings is greater than 3°C and the temperature compensation feature is disabled in **Setup**, the temperature warning icon will blink and the message “**WARNING: Large temperature change!**” will be displayed.



Pause screen

Press **Resume** to continue the measurement process.
Press **Stir** to start/stop the stirrer.



Sample reading confirm screen (only if this feature is enabled in setup)

Press **CFM** to memorize the reading.



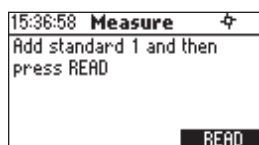
Wrong input error screen

This screen is displayed if the current reading is out of $\pm 2000\text{mV}$ range.



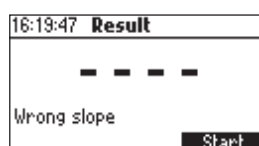
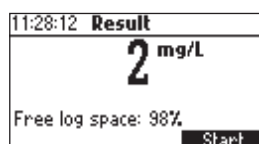
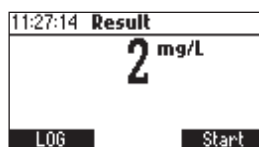
Wrong standard error screen

This screen is displayed if step 2 and 3 of the current reading is out of $\pm 2000\text{mV}$ range or if the difference between the stable readings from the current and the previous step is too small ($\pm 3\text{mV}$) or, if in auto confirm mode, the standard addition is not detected.



Add standard screen

Add the corresponding standard. Press **Read** to start the next step analysis if “**Reading confirm**” option is enabled in the **Setup** menu. If “**Reading confirm**” option is disabled, the instrument will start with the next step analysis.



Result screen

The ion concentration is displayed in mg/L (ppm) N-NH₃. If the concentration is out of range, the instrument displays the upper range limit blinking.

Press **LOG** to save the measured concentration. A message indicating the free log space will be displayed for a few seconds. If the free log space is under 10% this message will be permanently displayed.

Press **Start** to begin a new measurement cycle.

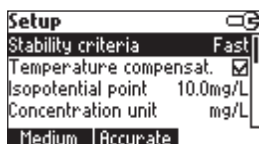
Wrong slope screen

This screen appears if the computed slope is not in the acceptable range. The acceptable range is 30% to 140% default slope (-56mV/decade).

Press **Start** to begin a new measurement cycle.

Setup screens

While in the **Setup** menu it is possible to modify the instrument's parameters. By pressing the **▲/▼** keys it is possible to move between the **Setup** options. Each menu item displays the current option. Press **HELP** to view the contextual help.



Stability criteria

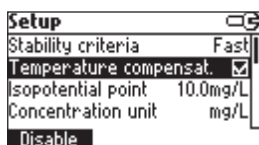
Options: **Accurate**, **Medium**, **Fast**.

Press the corresponding functional key to select the desired option.

Select **Accurate** for accurate measurements; long duration.

Select **Medium** for normal measurements.

Select **Fast** only for quick estimations; low accuracy in short time.



Temperature compensation

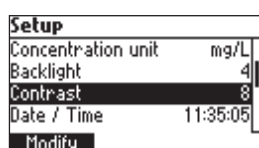
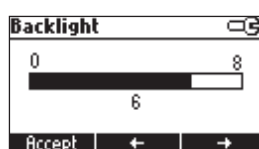
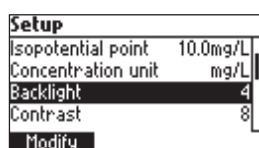
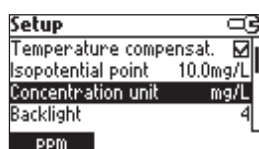
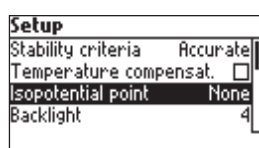
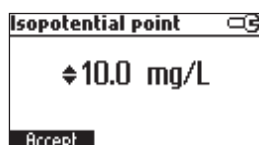
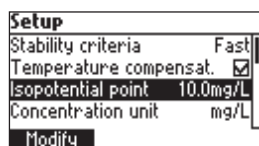
Options: **Enable**, **Disable**

Enable this feature only if **HI 7662-T** temperature probe is connected and electrode isopotential point is known.

If enabled, the meter will take into account the temperature of the readings when evaluating the final result.

If disabled, the computed concentration will not be temperature compensated.

Press the functional key to select the desired option.



Isopotential point

Options: 1.0 to 50.0 mg/L (ppm).

Press **Modify** to access the isopotential point concentration modify screen.

Press **▲/▼** to increase/decrease the isopotential point concentration.

Press **Accept** to confirm the value or **ESC** to return to the **Setup** menu without saving.

If the temperature compensation feature is disabled the meter will display "None" for the isopotential point, and the isopotential point modify screen cannot be accessed.

Concentration unit

Options: mg/L, ppm.

Press the corresponding functional key to select the desired concentration unit to be used in displaying measurements results.

Backlight

Options: On-Off, 1 to 8 levels.

Press **Modify** to access the backlight modify screen.

Press **▲/▼** or **←/→** in order to increase/decrease the display's backlight intensity.

Press **Accept** to confirm the value or **ESC** to return to the **Setup** menu without saving.

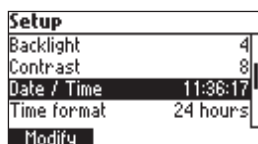
Contrast

Options: 0 to 20.

Press **Modify** to access the contrast value modify screen.

Press **▲/▼** or **←/→** in order to increase/decrease the display's contrast.

Press **Accept** to confirm the value or **ESC** to return to **Setup** menu without saving.



Date/Time

This option is used to set the instrument's date and time.

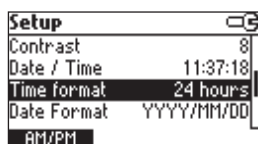
Press **Modify** to access the date/time modify screen.



Date/Time modify screen

Press \leftarrow/\rightarrow to select the value to be modified (year, month, day, hour, minute or second) and then press $\blacktriangle/\blacktriangledown$ in order to increase/decrease the value.

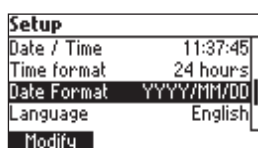
Press **Accept** to confirm the new values or **ESC** to return to **Setup** menu without saving.



Time format

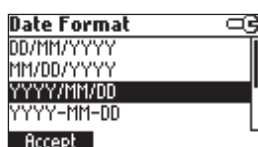
Options: **AM/PM** or **24 hours**.

Press the functional key in order to change the time format.



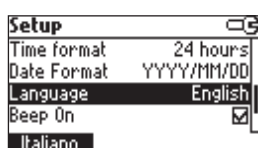
Date format

Press **Modify** to access the date format modify screen.



Press $\blacktriangle/\blacktriangledown$ or in order to select the desired date format.

Press **Accept** to confirm the value or **ESC** to return to the **Setup** menu without saving.

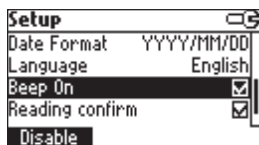


Language

Options: **Up to four languages**

This option is used to change the instrument's display language.

Press the corresponding functional key in order to select the new option. If the new selected language cannot be loaded, the previously selected language will be kept. The **HELP** information is not available if no language file can be loaded.



Beep status

Options: **Enable**, **Disable**

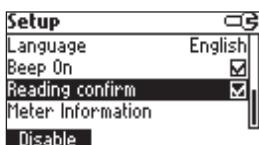
This option enables/disables the beep feature.

Press the functional key in order to select the new option.

When enabled, beep sounds as a short beep every time a key is pressed or when the reading must be confirmed.

In auto confirm mode the instrument will beep until the standard addition is detected.

A long beep alerts that the pressed key is not active.

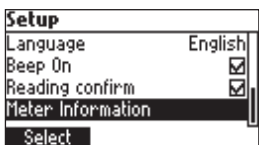


Reading confirm

Option: **Enable**, **Disable**

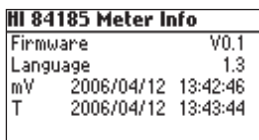
Enable this feature to manually confirm a stable reading. If disabled, the instrument will automatically store a reading when it becomes stable, and move to the next step of the measurement cycle.

Press the functional key in order to select the new option.



Meter information

Press **Select** to view the firmware version, language version, mV factory calibration date and time and temperature factory calibration date and time.



Recall screens

	Conc	Unit	Date
2	11	mg/L	2006/04/13
3	3	mg/L	2006/04/13
4	4	mg/L	2006/04/13
5	2	mg/L	2006/04/13

Delete All Delete More

Displays the list of all the memorized results. This list includes the record's number, the concentration value, the concentration unit and the date.

Press ▲/▼ to toggle between the stored records.

Record number: 5
Date: 2006/04/13
Time: 12:07:28
Conc: 2mg/L
Stability criteria: Accurate
Reading confirm: User

Press **More** to view a complete set of data corresponding to the selected record. To return to the previous screen press **ESC**.

Press ▲/▼ to toggle between complete record information screens.

Delete Record?			
2	11	mg/L	2006/04/13
3	3	mg/L	2006/04/13
4	4	mg/L	2006/04/13
5	2	mg/L	2006/04/13

CFM

Press **Delete** to erase the currently selected record from the instrument's memory. After pressing **Delete** the instrument will ask for confirmation. Press **CFM** to delete the record or **ESC** to return to the previous screen without deleting.

Deleting a record will reorganize the list of records.

Delete all records?			
2	11	mg/L	2006/04/13
3	3	mg/L	2006/04/13
4	4	mg/L	2006/04/13
5	2	mg/L	2006/04/13

CFM

Press **Delete All** to erase all the stored records. After pressing **Delete All** the instrument will ask for confirmation. Press **CFM** to delete all the records or **ESC** to return to the previous screen without deleting.

Results
No Records!

If the log is empty the message "No Records!" will be displayed.

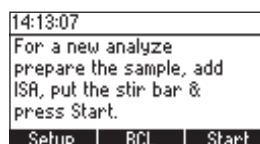
TIPS FOR AN ACCURATE MEASUREMENT

The instructions listed below should be carefully followed during analysis to ensure best accuracy.

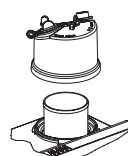
- Rinse the electrode with distilled or deionized water between samples, and blot dry taking care not to touch the membrane.
- Select the adequate stability criteria.
- Analyse the wine sample at room temperature.

MEASUREMENT PROCEDURE

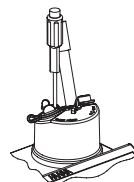
- Fill the beaker up to the 50 mL mark with sample, place the stir bar into the beaker and then place the beaker in the appropriate place on the instrument top.



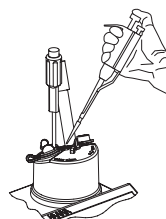
- Place the electrode holder on the top of the beaker and secure it by turning clockwise. Close all unused holes of the beaker holder.



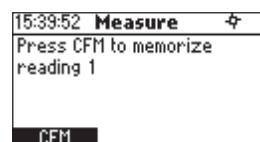
- Immerse HI 61101 ammonia electrode and the HI 7662-T temperature probe approximately 2 cm (0.8") into the sample to be tested paying attention to not touch the stir bar, and press **Start**.



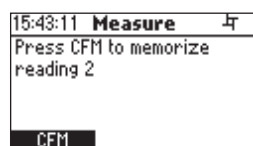
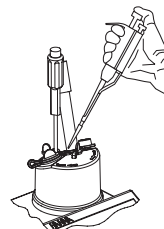
- Use the 1000 μ L automatic pipette to add exactly 1 mL HI 84185-0 ISA and immediately close the stopper.



- Wait until the reading is stable, **CFM** key displayed, if the "Reading confirm" option is selected, and then press **CFM**. If the "Reading confirm" option is disabled the instrument automatically memorizes the reading when this is stable and waits to add standard. Until the standard addition is detected the instrument will beep if beeper is enabled in **Setup**.

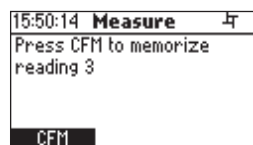


- Use the 1000 μL automatic pipette to add exactly 1 mL of **HI 84185-1** Standard and immediately close the stopper.



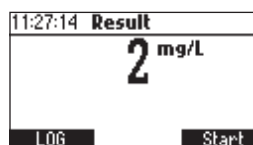
- Wait until the reading is stable, **CFM** key displayed, if the **"Reading confirm"** option is selected, and then press **CFM**. If the **"Reading confirm"** option is disabled the instrument automatically memorizes the reading when this is stable and waits to add standard. Until the standard addition is detected the instrument will beep if beeper is enabled in **Setup**.

- Use the 1000 μL automatic pipette to add exactly 1 mL of **HI 84185-2** Standard and immediately close the stopper.



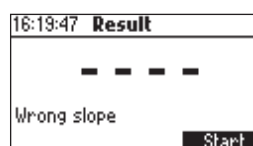
- Wait until the reading is stable, **CFM** key displayed, if the **"Reading confirm"** option is selected, and then press **CFM**. If the **"Reading confirm"** option is disabled the instrument automatically memorizes the reading when this is stable and computes result.

- At the end of the measurement procedure the result is displayed as mg/L (ppm) N-NH_3 .



Notes:

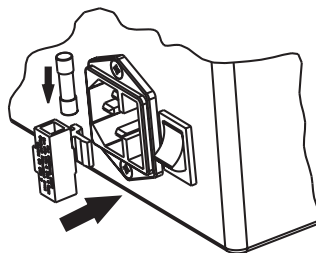
- If the reading is out of range, the upper range value is displayed blinking.
- If the evaluated slope is out of 30-140 % range the instrument displays "----" and **"Wrong slope"** message.
- If auto confirm mode is selected and beep feature is enabled, the instrument will beep after reading is confirmed until the addition of the standard is detected. If the adding of the standard is not detected after a period of time between 10 to 20 minutes, in according with the stability criteria, **"Wrong standard"** message will be displayed.



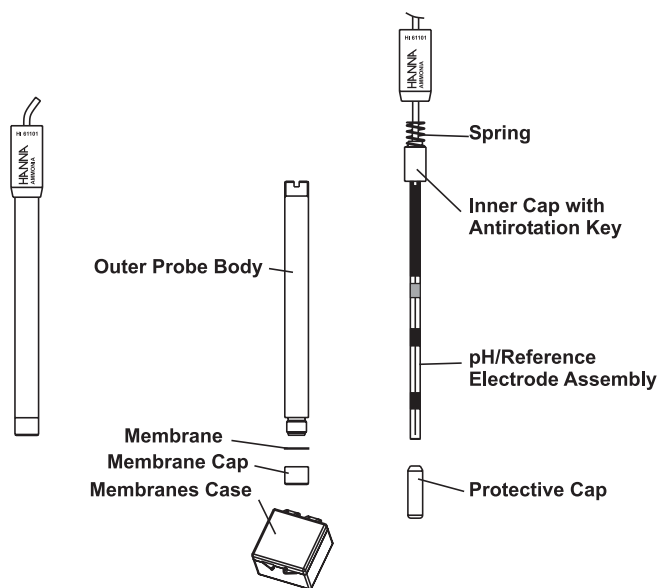
FUSE REPLACEMENT

To change the fuse follow next steps:

- Disconnect the power cord from the rear panel of the instrument.
- Pull out the fuse holder located near the power cord connector.
- Replace the fuse with a similar one.
- Push the fuse holder with the fuse in the appropriate place.



ELECTRODE CONDITIONING & MAINTENANCE



HI 61101 AMMONIA ELECTRODE

INNER ELECTRODE CHECK

- Before assembling the electrode for the first time or reactivating it after storage, the inner electrode assembly should be hydrated then tested as a pH electrode.
- Take two beakers and pour 50 mL de-ionized water in each of them.
- Add one powder packet of **HI 4000-47-4** pH 4 in one of the beakers.
- Add one powder packet of **HI 4000-47-7** pH 7 in the other beaker.
- Remove the protective shipping cap from the glass inner electrode. Handle the sensor by the black cap, and use with care to prevent breaking the glass.
- Or unscrew the upper cap on the top of the electrode and carefully withdraw the internal glass assembly. **Do not touch the sensing portion with your fingers.**
- If the sensor has been stored/shipped dry, it should be “conditioned” by soaking the pH glass in a small sample of one of the buffers, prepared above, for 1 hour or longer. Immerse the glass tip in small sample of the buffer while supporting the upper portion in an electrode holder. Take care that the glass is fragile.
- Connect the BNC connector on the cable assembly to a pH/mV (ORP mode) meter. Carefully immerse the sensor tip into the buffer. Record the mV in each solution once the values have stopped changing. Pay attention to minus sign if it is present.
- Rinse tip in deionized water and blot dry between buffers.
- Calculate the difference in mV between the two solutions.
- The ideal difference is 175 mV. Values greater than 180 mV are acceptable (90% efficiency).

PREPARATION PROCEDURE

- Hold the probe vertically, unscrew the top cap and remove the glass electrode inner body from the electrode outer body.
- Perform the inner electrode check.
- Unscrew membrane cap from outer body and install membrane using tweezers. Avoid touching working area of membrane with your fingers as skin oil will change the hydrophobic properties of the membrane. Discard paper backing between membranes. Drape membrane over lower opening of outer body and hold one corner against the threads. Smooth excess membrane material around the threads.
- Screw outer membrane cap onto body thus capturing the membrane between the cap and outer body thread.
- Add 2 mL of Ammonia internal electrolyte **HI 4001-40** into outer probe body.
- Insert and position the internal glass part into the outer body so that the anti-rotation key sits in the cutout on the outer probe body.

- Slide electrode cap and spring down cable and screw top cap onto outer body until fully engaged. Afterwards, unscrew top cap two times. Do not invert electrode. Keep the membrane side down.
- Gently pull spring loaded cable back and slowly release to allow filling solution to migrate between membrane and glass electrode inner body. Screw top cap onto outer body until fully engaged.
- Install assembled electrode in gas sensor test vessel or in electrode holder and connect cable connector to the meter.

SAMPLE HANDLING

- Keep samples stored in tightly converted bottles to prevent ammonia loss or ammonia contamination from other sources.
- Alkaline samples must be measured at once or acidified for storage. (HCl may be added to bring pH to 6).
- Acidic samples such as wine or juice may require additional ISA quantity because the pH of the sample should be around 11 for measurement.
- Measure samples and standards quickly after adding ISA because ammonia gas will escape from the solution.
- For solution containing oil, sludge and waste samples (which may contain surfactants), digest sample first using a total Kjeldahl nitrogen (TKN) procedure.
- For samples found to penetrate or "wet" the membrane. Measurements may be made above the sample in a small headspace of a closed system (flask). The system should be saturated with water vapor, the membrane tip suspended in the vapor phase above the sample, and the concentration of N-NH_3 greater than 10^{-3}M . In this case a longer response time is expected.
- Reuse of standards with already added ISA is not advised, because loss of ammonia is expected.

CLEANING PROCEDURE

If the sensor slope just misses the suggested slope window, soaking the sensor in a standard for a period of time may solve the problem (choose 10^{-2}M or 1 000 ppm Ammonia standard).

Rinse in deionised water and blot dry.

QUICK CHECK OF THE ELECTRODE SLOPE

- Connect the electrode and the reference electrode to the instrument.
- Press and hold down **ESC**, **▲** and **HELP** keys simultaneously and power on the meter. Wait until the instrument enters in the reading check mode.
- Fill a beaker with 50 mL of deionized water and put a stir bar inside. Place the beaker in its appropriate place on the instrument top.
- Put the electrode holder and insert the electrode and temperature probe in the solution. Add 2 mL of **HI 84185-0** ISA buffer. Close all holes.
- Add rapidly 1 mL of **HI 84185-1** Standard taking care to close all holes immediately after addition. Wait for the reading to stabilize and record the mV value.
- Add rapidly 10 mL of **HI 84185-1** Standard like before taking care to close all holes immediately after addition. Wait for the reading to stabilize and record the mV value.
- The difference between the two recorded mV values gives the slope of the electrode. An accepted value for this slope is $-56 \pm 4 \text{ mV}$.
- If sensor does not change mV the internal glass may have broken.
- Press **ESC** to leave the reading check mode.

PERIODIC MAINTENANCE

Inspect the electrode and the cable. The cable used for connection to the instrument must be intact and there must be no points of broken insulation on the cable, or cracks on the electrode stem or bulb. Connectors must be perfectly clean and dry. If any scratches or cracks are present, replace the electrode. Rinse electrode with deionized water between samples and blot dry with lab wipe or other soft disposable absorbent towelling.

STORAGE PROCEDURE

The **HI 61101** probe can be stored assembled in **HI 4001-45** Ammonia Conditioning and Storage solution overnight or short term. Gently pull on the cable to compress the spring mechanism thus permitting electrolyte to exchange from the bulk to the thin film between the membrane and glass before resuming use. For storage over a week, disassemble the sensor completely and rinse off the inner pH/ref assembly, the outer body and the membrane cap. Discard membrane. Cover the glass tip with the protective cover used in shipment and store parts securely in the original shipping box. When reassembling the sensor follow the Preparation Procedure section.

MAINFUNCTIONING

- No slope (meter always reads the same value):
Repeat the measurement with a fresh ammonia electrode.

ACCESSORIES

REAGENT SETS

HI 4001-40	Ammonia filling solution
HI 4001-45	Ammonia conditioning and storage solution
HI 4000-47	Buffer replacement kit
HI 84185-20	Reagent set
HI 84185-0	ISA for Ammonia electrode (500 mL)
HI 84185-1	Standard 1 for Ammonia electrode (500 mL)
HI 85185-2	Standard 2 for Ammonia electrode (500 mL)

OTHER ACCESSORIES

HI 61001-51	Membrane (20 pcs.)
HI 61101	Ammonia electrode
HI 731316	Stir bar (5 pcs.)
HI 731341	Automatic pipette 1000 μ L
HI 731351	Tips for 1000 μ L automatic pipette (25 pcs.)
HI 731355P	Capillary pipette (20 pcs.)
HI 740036P	Plastic beaker 50 mL (10 pcs.)
HI 70143	Syringe 1 mL (6 pcs.)
HI 740144	Syringe tip (6 pcs.)
HI 7662-T	Temperature probe

WARRANTY

HI 84185 is warranted for two years against defects in workmanship and materials when used for its intended purpose and maintained according to the instructions.

This warranty is limited to repair or replacement free of charge.

Damage due to accident, misuse, tampering or lack of prescribed maintenance is not covered. If service is required, contact your dealer. If under warranty, report the model number, date of purchase, serial number and the nature of the failure. If the repair is not covered by the warranty, you will be notified of the charges incurred.

If the instrument is to be returned to Hanna Instruments, first obtain a **Returned Goods Authorization Number** from the **Customer Service Department** and then send it with shipment costs prepaid. When shipping any instrument, make sure it is properly packaged for complete protection.

To validate your warranty, fill out and return the enclosed warranty card within 14 days from the date of purchase.

Recommendations for Users

Before using this product, make sure that it is entirely suitable for your specific application and for the environment in which it is used.

Operation of this instrument may cause unacceptable interferences to other electronic equipments, this requiring the operator to take all necessary steps to correct interferences.

Any variation introduced by the user to the supplied equipment may degrade the instrument EMC performance.

To avoid damages or burns, do not put the instrument in microwave ovens. For yours and the instrument's safety do not use or store the instrument in hazardous environments.

Hanna Instruments reserves the right to modify the design, construction and appearance of its products without advance notice.

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www.hannainst.com.*

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